PATENT ABSTRACTS OF JAPAN

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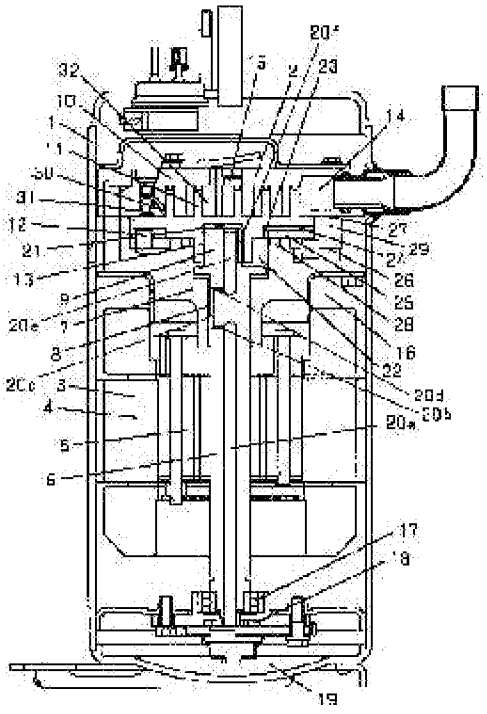
(54) SCROLL COMPRESSOR

(57)Abstract:

PROBLEM TO BE SOLVED: To solve problems of the oil feed groove provided in a crankshaft in a pressure-difference oil feeding method, wherein the groove is required to be small for enlarging the resistance and the groove inside is decompressed from a delivery pressure to an intermediate pressure and refrigerant included in lubricating oil is evaporated in a groove to cause oil shortage and cause abrasion and seizure of a shaft.

SOLUTION: A hole for communicating an inside region with an outside region of an annular seal member is intermittently provided by a turning movement of a turning component as a restriction part in a surface in the back pressure chamber side of a turning mirror plate. A side channel lubricating oil path for feeding oil in a lubricating oil sump in the bottom part of the hermetically sealed vessel using a differential pressure between a hermetically sealed vessel pressure and the back pressure chamber is provided in a bearing sliding part and a connection part between the crankshaft and a turning spiral component.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention is used for a refrigerating cycle device etc., and provides the scroll compressor of high quality and high-reliability with a simple structure.
[0002]
[Description of the Prior Art]This conventional kind of compressor is explained with a drawing. Drawing 5 is a scroll compressor with which the electric motor 303 and the compression mechanism part 302 are allocated in the inside of the well-closed container 301. The electric motor 303 consists of the stator 304 fixed inside the well-closed container 301, and the rotor 305 supported inside this stator 304 enabling free rotation, and the crankshaft 306 is combined with this rotor 305 by the penetrating state. The end of this crankshaft 306 is supported by the bearing 308 currently fixed to the bearing parts 307 which constitute a part of above-mentioned compression mechanism part 302, enabling free rotation.
[0003]It has the eccentric part 309 which performs eccentric motion to the crankshaft 306 at the tip of the crankshaft 306 currently supported by the bearing 308. On the other hand, two or more compression space is formed by engaging the fixed swirl part article 310 and the revolution swirl part article 311, Only by having the rotation restrain part article 312 of the revolution swirl part article 311, preventing rotation, and making it circle via the fixed pivot receptacle 313 which joined the revolution swirl part article 311 to the revolution swirl part article 311 by the eccentric part 309, A refrigerant gas etc. are inhaled and compressed from the suction port 313 by moving compression space, decreasing capacity toward the vortical center.
[0004]The compressed refrigerant gas passes along the discharge port 315, and is breathed out by the well-closed container inner space 316. The other end side of the crankshaft 306 is supported with the bearing parts 317, It has the positive displacement pump 318 at the tip by the side of the other end of the crankshaft 306, the positive displacement pump 318 should pass the oil supply course 320 which supplies the lubricating oil provided in the center of the shaft orientations of the crankshaft 306 from the lubricous sump ball 319 -- going via the lubricous sump ball 321 of the upper part of the eccentric part 309 -- the fixed pivot receptacle 313 -- lubrication -- and, [cool and] The recirculation is performed after carrying out the lubrication of the bearing 308 through the lubricous sump ball 322.
[0005]On the other hand, some lubricating oils supplied to the lubricous sump ball 321. It is decompressed and the space 329 which was established in the revolution panel 325 and the bearing parts 307 from the converging section 324 via the long hole 323 provided in the inside of the revolution swirl part article 311

and which became depressed and comprised 326, the upper surface 327 of the fixed swirl part article 310, and the sealing member 328 is supplied.
[0006]The sealing member 328 has a role of the seal of the lubricous sump ball 322 which is a high pressure part, and the space 329. The lubricating oil which the rotation restrain part article 312 is allocated in this space 329, and is supplied to this space 329 is performing lubrication. The pressure of the space 329 rises as the lubricating oil supplied to the space 329 collects, but. In order to keep the pressure constant, the pressure regulation mechanism 331 is constituted between the space 329 and the suction space 330 which generates compression space, If the pressure of the space 329 becomes higher than the set-up pressure, the pressure regulation mechanism 331 will operate and the lubricating oil in the space 329 will be supplied to the suction space 330, The pressure in the space 329 was kept almost constant, and the lubricating oil supplied to the suction space 330 was led to compression space, and the role of the seal which prevents the leakage of the refrigerant gas under compression, etc., and the role which carries out the lubrication of the contact surface of the fixed swirl part article 310 and the revolution swirl part article 311 are played.
[0007]Next, the converging section 324 is explained using drawing 6.The converging section 324 is a cylindrical pin with a thread part, and the small hole 332 is constituted by the center of the pin.
It extracts by the small hole and an effect is generated, a lubricating oil is decompressed in the space 329 from the space 321 shown in drawing 3, and the appropriate amount is supplied.
The appropriate amount is adjusted by changing the inside diameter of a small hole. [0008]As a scroll compressor of a simple structure, the thing of the structure which adopted the differential pressure oil supply method as a lubrication mechanism was devised as indicated to JP,61-19803,B. The oil supply method of the lubricating oil of this kind of scroll compressor establishes an oil supply groove parallel to an axis in the peripheral face of a crankshaft, and is supplying with oil with the differential pressure power of a discharge pressure and an intermediate pressure by resistance of this oil supply groove. The above-mentioned oil supply groove is established in the position from which it separated from the line of action of load.
It has the structure of adjusting the amount of oil supply with resistance of an oil supply groove.
An oil supply course is provided in each bearing in parallel from the lubricous sump ball of a well-closed container pars basilaris ossis occipitalis, and lubrication is performed to each bearing.
[0009]
[Problem(s) to be Solved by the Invention]however, in order to achieve diaphragm effect of a converging section in the above-mentioned composition, when it made the inside diameter of the small hole small or the length of the hole was lengthened, while becoming easy to blockade with the garbage which exists in a lubricating oil and reducing the performance of the compressor, processing of a small hole had the technical problem that cost increased.
[0010]Since it does not have the positive displacement pump in the composition of the scroll compressor which adopted the differential pressure oil supply method as JP,61-19803,B as a lubrication mechanism of a statement as a scroll compressor of a simple structure, it is possible to reduce component cost. However, it was difficult to establish an oil supply groove parallel to an axis in the peripheral face of a crankshaft, and for resistance to change with the depth of an oil supply groove, and the crevices between a bearing and a crankshaft in the composition which supplies each bearing with oil by the differential pressure power of a discharge pressure and an intermediate pressure by resistance of this oil supply groove, and to stabilize the amount of oil supply. When an oil supply groove was established in a crankshaft, in order that it was

necessary to provide a slot very small since it is necessary to resist greatly and Mizouchi might decompress from a discharge pressure to an intermediate pressure, there was a problem which boils within the refrigerant fang furrow contained in a lubricating oil, produces an oil piece, and produces wear and seizure of an axis.
[0011]Since an oil supply course was provided in each bearing in parallel from the lubricous sump ball of a well-closed container pars basilaris ossis occipitalis and lubrication was performed, the amount of oil supply to each bearing decreased to each bearing, and there was a problem which produces wear and seizure of an axis in it.
[0012]This invention solves such a conventional technical problem.
The purpose is efficient and to provide the scroll compressor of low cost.

[0013]
[Means for Solving the Problem]A fixed swirl part article in which the scroll compressor according to claim 1 has a fixed swirl shuttlecock and a horizon glass board, A revolution swirl shuttlecock, a revolution swirl part article which has a revolution panel, and a crankshaft which drives said revolution swirl part article, A compression mechanism part which comprises main guide bearing which supports an end of said crankshaft enabling free rotation, It has in a well-closed container which stores an electric motor part which drives said crankshaft, and a compression mechanism part and an electric motor part, While forming a lubricous sump ball in said well-closed container and maintaining inside of said well-closed container to a discharge pressure, Form in said revolution swirl vane faces and an opposite hand of said revolution swirl part article a backpressure chamber intercepted in pressure in said well-closed container, and differential pressure of front well-closed container internal pressure and said backpressure chamber is used, . Pass a feed hole in said crankshaft from an inlet port in which an oil of said lubricous sump ball was provided on both sides of said electric motor part of said crankshaft in an opposite hand of said compression mechanism part. In a scroll compressor provided with lubricous oil routes which refuel said backpressure chamber in a lubricating oil via said main-guide-bearing sliding part, a connecting part of said crankshaft and said revolution swirl part article, and a converging section, and also supply said lubricating oil to suction space, Said backpressure chamber is divided to an inner area and an outside area by an annular sealing member, A hole which is intermittently open for free passage by circular movement of said revolution swirl part article as said converging section to said inner area and said outside area of said annular sealing member is provided in said revolving superstructure article, And it has lubricous oil routes of one passage for an oil of said lubricous sump ball in said backpressure chamber through a feed hole in said crankshaft via said bearing sliding part, a connecting part of said crankshaft and said revolution swirl part article, and said converging section.
[0014]A panel part of said revolution swirl part article is contacted to a panel side of said fixed swirl part article because the scroll compressor according to claim 2 impresses constant pressure to the back of said revolution swirl part article, And while providing so that a crevice may always be faced a panel side of said fixed swirl part article as said converging section in said outside area, A hole which said crevice and said inner area open for free passage intermittently by circular movement of said revolving superstructure article is provided in said revolving superstructure article, And it has lubricous oil routes of one passage for an oil of said lubricous sump ball in said backpressure chamber through a feed hole in said crankshaft via said main-

guide-bearing sliding part, a connecting part of said crankshaft and said revolution swirl part article, and said converging section.
[0015]
[Embodiment of the Invention]The compressor by a 1st embodiment of this invention divides a backpressure chamber to an inner area and an outside area by an annular sealing member, The hole which is intermittently open for free passage to the inner area and outside area of an annular sealing member by circular movement of a revolution swirl part article as a converging section is provided in a revolving superstructure article, And performance and a reliable scroll compressor are realizable by low cost by having lubricous oil routes of one passage for the oil of a lubricous sump ball in said backpressure chamber through the feed hole in said crankshaft via a main-guide-bearing sliding part, the connecting part of a crankshaft and a revolution swirl part article, and a converging section.
[0016]The panel part of a revolution swirl part article is contacted to the panel side of a fixed swirl part article because the compressor by a 2nd embodiment of this invention impresses constant pressure to the back of a revolution swirl part article, And while providing so that a crevice may always be faced the panel side of a fixed swirl part article as a converging section in said outside area, The hole which a crevice and an inner area open for free passage intermittently by circular movement of a revolving superstructure article is provided in said revolving superstructure article, And by having lubricous oil routes of one passage for the oil of a lubricous sump ball in a backpressure chamber through the feed hole in a crankshaft via a main-guide-bearing sliding part, the connecting part of a crankshaft and a revolution swirl part article, and a converging section, Since a suitable oil amount is supplied by low cost, efficiency can realize a good and reliable scroll compressor.
[0017]
[Example]The example of this invention according to claim 1 is described based on a drawing. Drawing 1 is a sectional view of one example of the scroll compressor concerning this invention. The electric motor 3 and the compression mechanism part 2 are allocated in the inside of the well-closed container 1. The electric motor 3 consists of the stator 4 fixed inside the well-closed container 1, and the rotor 5 supported inside this stator 4 enabling free rotation, and the crankshaft 6 is combined with this rotor 5 by the penetrating state.
[0018]The end of this crankshaft 6 is supported by the bearing 8 currently fixed to the bearing parts 7 which constitute a part of above-mentioned compression mechanism part 2, enabling free rotation. It has the eccentric part 9 which performs eccentric motion to the crankshaft 6 at the tip of the crankshaft 6 currently supported by the bearing 8. On the other hand, two or more compression space is formed by engaging the fixed swirl part article 10 and the revolution swirl part article 11, Only by having the rotation restrain part article 12 of the revolution swirl part article 11, preventing rotation, and making it circle via the fixed pivot receptacle 13 which joined the revolution swirl part article 11 to the revolution swirl part article 11 by the eccentric part 9, A refrigerant gas etc. are inhaled and compressed from the suction port 14 by moving compression space, decreasing capacity toward the vortical center. The compressed refrigerant gas passes along the discharge port 15, and is breathed out by the well-closed container inner space 16. The other end side of the crankshaft 6 is supported with the bearing parts 17.
[0019]The lubricating oil of the lubricous sump ball 19 is refueled by each portion using differential pressure with the space 29 which was established in the pressure, the revolution panel 25, and the bearing parts 7 of the well-closed container inner space 16 and which became depressed and comprised 26, the upper surface

27 of the fixed swirl part article 10, and the sealing member 28. First, the lubrication of the bearing 8 is carried out by the oil supply groove 20c through the feed hole 20b established in the diameter direction of the crankshaft from the oil supply course 20a installed in the center of the shaft orientations by the side of the other end of the crankshaft 6. and pass 20 d of feed holes established in the diameter direction of the crankshaft -- 20 f of oil supply grooves established in the crankshaft 9 via the oil supply course 20a and the oil supply course 20e which is not open for free passage by the same mind -- the fixed pivot receptacle 13 -- lubrication -- and it cools.

[0020]The opening of the oil supply groove 20c is not carried out to the lubricous sump ball 22, but the seal is carried out by the peripheral part of the bearing 8 and the crankshaft 6. Then, the space 29 which was established in the revolution panel 25 and the bearing parts 7 from the oblong hole 24 via the hole 23 provided in the inside of the revolution swirl part article 11 and which became depressed and comprised 26, the upper surface 27 of the fixed swirl part article 10, and the sealing member 28 is supplied.

[0021]The sealing member 28 has a role of the seal of the lubricous sump ball 22 which is a high pressure part, and the space 29. The lubricating oil which the rotation restrain part article 12 is allocated in this space 29, and is supplied to this space 29 is performing lubrication. The pressure of the space 29 rises as the lubricating oil supplied to the space 29 collects, but. In order to keep the pressure constant, the pressure regulation mechanism 31 is constituted between the space 29 and the suction space 30 which generates compression space, If the pressure of the space 29 becomes higher than the set-up pressure, the pressure regulation mechanism 31 will operate and the lubricating oil in the space 29 will be supplied to the suction space 30, The pressure in the space 29 was kept almost constant, and the lubricating oil supplied to the suction space 30 was led to compression space, and the role of the seal which prevents the leakage of the refrigerant gas under compression, etc., and the role which carries out the lubrication of the contact surface of the fixed swirl part article 10 and the revolution swirl part article 11 are played.

[0022]Next, the hole 23 is explained with reference to drawing 2. The hole 23 performs the circular motion for between the lubricous sump ball 22 which is a high pressure part, and the space 29 with a circular movement of a revolution swirl part article ranging over the sealing member 28. When the hole 23 has attended the lubricous sump ball 22, the lubricating oil of the lubricous sump ball 22 is supplied to the space 29 via the hole 23 and the hole 24. However, a lubricating oil is not supplied when the hole 23 has attended the sealing member 28 or the space 29, without attending the lubricous sump ball 22. The quantity of the lubricating oil supplied to the space 29 can be adjusted by adjusting the rate that the hole 23 has attended the lubricous sump ball 22.

[0023]The example of this invention according to claim 2 is described based on a drawing. Drawing 3 is a sectional view of one example of the scroll compressor concerning this invention. The electric motor 203 and the compression mechanism part 202 are allocated in the inside of the well-closed container 201. The electric motor 203 consists of the stator 204 fixed inside the well-closed container 201, and the rotor 205 supported inside this stator 204 enabling free rotation, and the crankshaft 206 is combined with this rotor 205 by the penetrating state. The end of this crankshaft 206 is supported by the bearing 208 currently fixed to the bearing parts 207 which constitute a part of above-mentioned compression mechanism part 202, enabling free rotation. It has the eccentric part 209 which performs eccentric motion to the crankshaft 206 at the tip of the crankshaft 206 currently supported by the bearing 208.

[0024]On the other hand, two or more compression space is formed by engaging the fixed swirl part article

210 and the revolution swirl part article 211, Only by having the rotation restrain part article 212 of the revolution swirl part article 211, preventing rotation, and making it circle via the fixed pivot receptacle 213 which joined the revolution swirl part article 211 to the revolution swirl part article 211 by the eccentric part 209, A refrigerant gas etc. are inhaled and compressed from the suction port 214 by moving compression space, decreasing capacity toward the vortical center. The compressed refrigerant gas passes along the discharge port 215, and is breathed out by the well-closed container inner space 216. The other end side of the crankshaft 206 is supported with the bearing parts 217.

[0025]The lubricating oil of the lubricous sump ball 219 is refueled by each portion using differential pressure with the space 229 and the lubricous sump ball 222 which were formed in the pressure, the revolution panel 225, and the bearing parts 207 of the well-closed container inner space 216 and which became depressed and comprised the upper surface 227 of 226 and the fixed swirl part article 210. First, the lubrication of the bearing 208 is carried out by the oil supply groove 220c through the feed hole 220b established in the diameter direction of the crankshaft from the oil supply course 220a installed in the center of the shaft orientations by the side of the other end of the crankshaft 206. and pass 220 d of feed holes installed in the inside of the crankshaft 206 so that the oil supply groove 220c and the oil supply groove 220e established in the eccentric part 209 might be connected -- the oil supply groove 220e -- the fixed pivot receptacle 213 -- lubrication -- and it cools. The opening of the oil supply groove 220c and the oil supply groove 220e is not carried out to the lubricous sump ball 222, but the seal is carried out to the bearing 208, the crankshaft 206, and the turning bearing 213 in the eccentric part 209, respectively.

[0026]Then, it passes along the crevice 233 constituted from the hole 224 by the upper surface 227 of the fixed swirl part article via the long hole 223 provided in the inside of the revolution swirl part article 211, It is supplied with oil by the lubricous sump ball 222 after the space 229 which was established in the revolution panel 225 and the bearing parts 207 and which became depressed and comprised the upper surface 227 of 226 and the fixed swirl part article 210 is supplied.

[0027]In this composition, the sealing member 228 installed by claim 1 is unnecessary. The lubricating oil which the rotation restrain part article 212 is allocated in this space 229, and is supplied to this space 229 is performing lubrication. The pressure of the space 229 and the lubricous sump ball 222 rises as the lubricating oil supplied to the space 229 and the lubricous sump ball 222 collects, but. In order to keep the pressure constant, the pressure regulation mechanism 231 is constituted between the space 229 and the suction space 230 which generates compression space, If the pressure of the space 229 and the lubricous sump ball 222 becomes higher than the set-up pressure, the pressure regulation mechanism 231 will operate and the lubricating oil in the space 229 will be supplied to the suction space 230, The pressure in the space 229 and the lubricous sump ball 222 was kept almost constant, and the lubricating oil supplied to the suction space 230 was led to compression space, and the role of the seal which prevents the leakage of the refrigerant gas under compression, etc., and the role which carries out the lubrication of the contact surface of the fixed swirl part article 210 and the revolution swirl part article 211 are played.

[0028]Next, the hole 224 and the crevice 233 are explained with reference to drawing 4. The hole 224 performs the circular motion which attends the upper surface 227 and the crevice 233 of the fixed swirl part article 210, respectively with a circular movement of a revolution swirl part article. When the hole 224 has attended the crevice 233, the lubricating oil of the lubricous sump ball 221 passes along the crevice 233 via the long hole 223 and the hole 224, and is supplied to the space 229. However, when the hole 224 has

attended the upper surface 227 of the fixed swirl part article 210, the hole 224 is blockaded by the upper surface 227 and a lubricating oil is not supplied. The quantity of the lubricating oil supplied to the space 229 can be adjusted by adjusting the rate that the hole 224 has attended the crevice 233. as [show / in drawing 4 / the shape of the crevice 233] -- I hope that it is not circular.

[0029]

[Effect of the Invention]So that clearly from the above-mentioned example the invention according to claim 1, Divide a backpressure chamber to an inner area and an outside area by an annular sealing member, and the hole which is intermittently open for free passage to the inner area and outside area of an annular sealing member by circular movement of a revolution swirl part article as a converging section is provided in a revolving superstructure article, And it is possible to control the quantity of a lubricating oil by having lubricous oil routes of one passage for the oil of the lubricous sump ball of a well-closed container pars basilaris ossis occipitalis using the differential pressure of well-closed container internal pressure and a backpressure chamber in a main-guide-bearing sliding part and a fixed pivot receptacle sliding part, The degradation by inhalation heating is controlled and the effect that a reliable scroll compressor is realizable is done so in sliding parts, such as a bearing.

[0030]The panel part of a revolution swirl part article is contacted to the panel side of a fixed swirl part article because the invention according to claim 2 impresses constant pressure to the back of a revolution swirl part article, While providing so that a crevice may always be faced the panel side of a fixed swirl part article as a converging section in said outside area, Provide the hole which a crevice and an inner area open for free passage intermittently by circular movement of a revolving superstructure article in said revolving superstructure article, and the differential pressure of well-closed container internal pressure and a backpressure chamber is used for the oil of the lubricous sump ball of a well-closed container pars basilaris ossis occipitalis, By having lubricous oil routes of one passage in a main-guide-bearing sliding part and a fixed pivot receptacle sliding part, it is possible to control the quantity of a lubricating oil, the degradation by inhalation heating is controlled, and the effect that a reliable scroll compressor is realizable is done so in sliding parts, such as a bearing.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]The sectional view of the scroll compressor in which the 1st example of this invention is shown
[Drawing 2]The revolution swirl part Shinabe article rear elevation in the 1st example of this invention
[Drawing 3]The sectional view of the scroll compressor in which the 2nd example of this invention is shown
[Drawing 4]The figure showing the upper surface of the panel of the revolution swirl part Shinabe article seen from the back of the revolution swirl part Shinabe article in the 2nd example of this invention, and a fixed swirl part Shinabe article
[Drawing 5]The sectional view of the conventional scroll compressor
[Drawing 6]The sectional view of the conventional lubricating oil converging section
[Description of Notations]
1 Well-closed container
2 Compression mechanism part
6 Crankshaft
10 Fixed swirl part article
11 Revolution swirl part article
19 and 21 Lubricous sump ball
20a, e oil supply course
20b, d feed hole
20c, f oil supply groove
23 Hole
24 Long hole
25 Revolution panel
26 Hollow
220a Oil supply course
220b, d feed hole
220c, e oil supply groove
223 Long hole
224 Hole
233 Crevice

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CLAIMS

[Claim(s)]
[Claim 1]A fixed swirl part article which has a fixed swirl shuttlecock and a horizon glass board.
A revolution swirl part article which has a revolution swirl shuttlecock and a revolution panel.
A crankshaft which drives said revolution swirl part article.
A compression mechanism part which comprises main guide bearing which supports an end of said crankshaft enabling free rotation.
It has in a well-closed container which stores an electric motor part which drives said crankshaft, and a compression mechanism part and an electric motor part, While forming a lubricous sump ball in said well-closed container and maintaining inside of said well-closed container to a discharge pressure, Form in said revolution swirl vane faces and an opposite hand of said revolution swirl part article a backpressure chamber intercepted in pressure in said well-closed container, and differential pressure of front well-closed container internal pressure and said backpressure chamber is used, . Pass a feed hole in said crankshaft from an inlet port in which an oil of said lubricous sump ball was provided on both sides of said electric motor part of said crankshaft in an opposite hand of said compression mechanism part. Lubricous oil routes which refuel said backpressure chamber in a lubricating oil via said main-guide-bearing sliding part, a connecting part of said crankshaft and said revolution swirl part article, and a converging section, and also supply said lubricating oil to suction space.
Are the scroll compressor provided with the above and said backpressure chamber is divided to an inner area and an outside area by an annular sealing member, A hole which is intermittently open for free passage by circular movement of said revolution swirl part article as said converging section to said inner area and said outside area of said annular sealing member is provided in said revolving superstructure article, And it has lubricous oil routes of one passage for an oil of said lubricous sump ball in said backpressure chamber through a feed hole in said crankshaft via said main-guide-bearing sliding part, a connecting part of said crankshaft and said revolution swirl part article, and said converging section.

[Claim 2]A panel part of said revolution swirl part article is contacted to a panel side of said fixed swirl part article by impressing constant pressure to the back of said revolution swirl part article, And while providing so that a crevice may always be faced a panel side of said fixed swirl part article as said converging section in said outside area, A hole which said crevice and said inner area open for free passage intermittently by circular movement of said revolving superstructure article is provided in said revolving superstructure article,

And the scroll compressor according to claim 1 having lubricous oil routes of one passage for an oil of said lubricous sump ball in said backpressure chamber through a feed hole in said crankshaft via said main-guide-bearing sliding part, a connecting part of said crankshaft and said revolution swirl part article, and said converging section.

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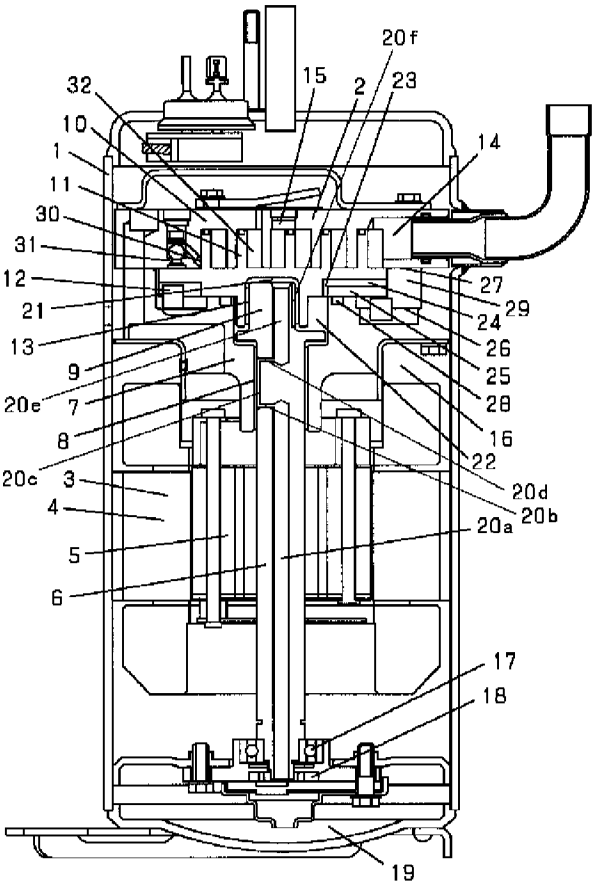
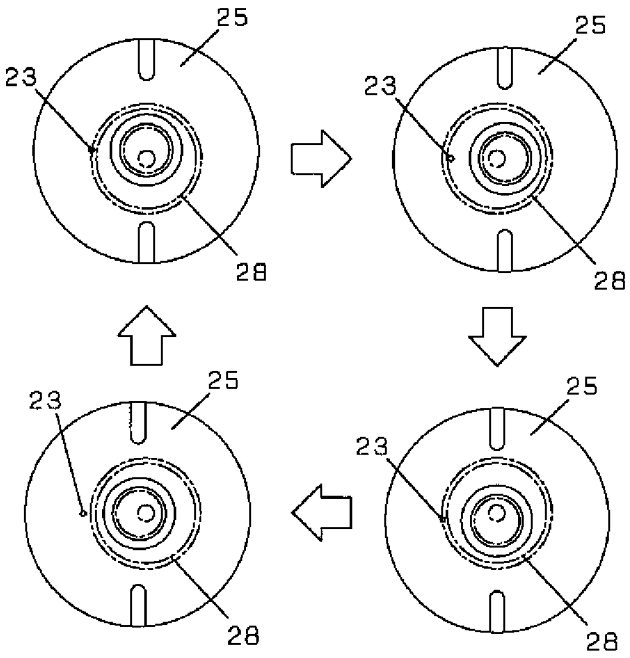
DRAWINGS

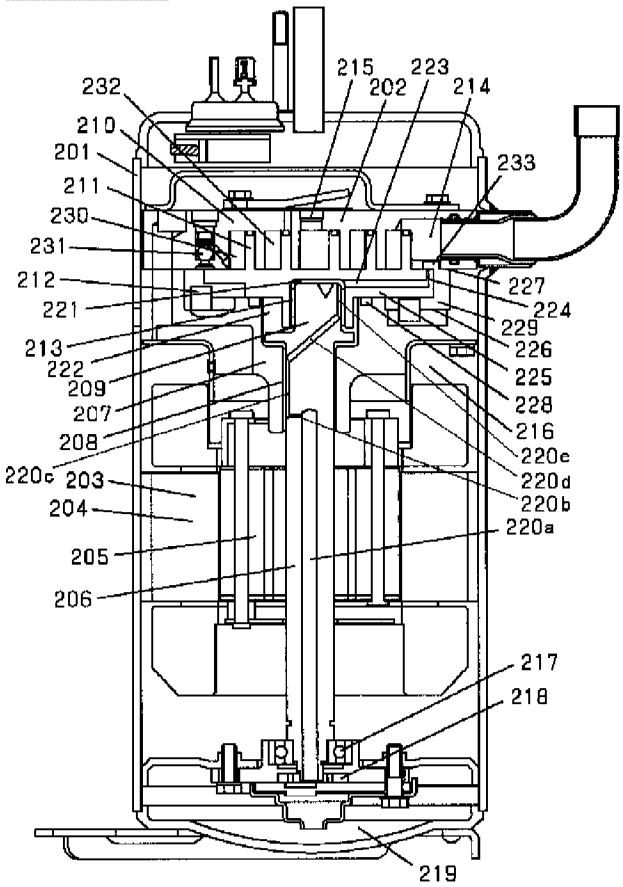
[Drawing 1]



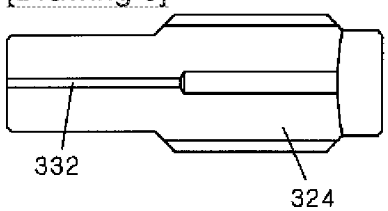
[Drawing 2]



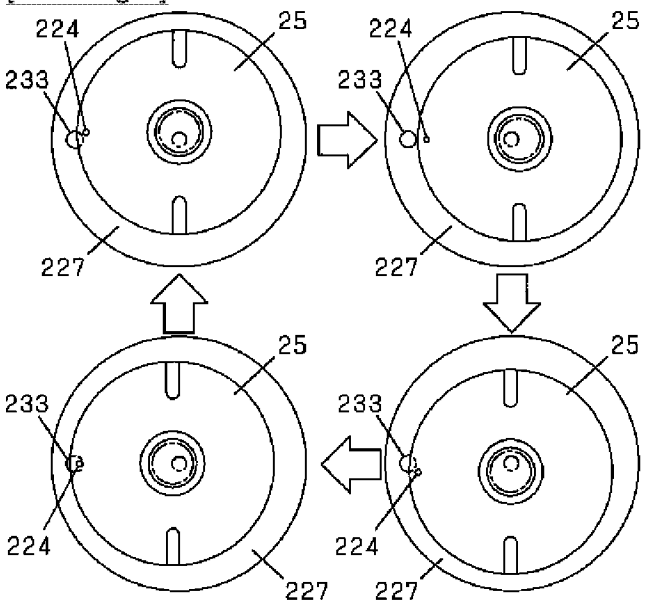
[Drawing 3]



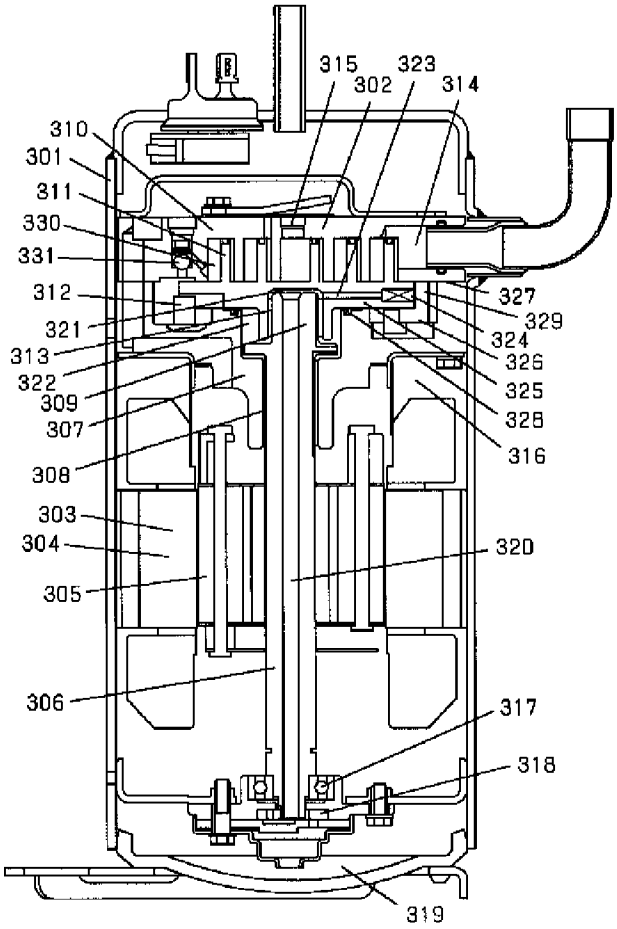
[Drawing 6]



[Drawing 4]



[Drawing 5]



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